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EXAMINER

DI GRAZIO, JEANNE A

ART UNIT

PAPER NUMBER

2871

DATE MAILED: 10/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/057,952

Applicant(s)

NAKAYAMA ET AL.

Examiner

Jeanne A. Di Grazio

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-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9 and 11-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 11-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Priority***

Priority to Japanese Patent Applications 2001-028982 (Feb. 6, 2001) and 2001-229099 (July 30, 2001) is claimed.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1, 9, 13, 14, 16, and 17 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's added limitation of "the first pixel electrode applying a first electric field to the liquid crystal, and the second pixel electrode applying a second electric field whose strength is different from the first electric field to the liquid crystal" redefines the nature of the claims from first and second electrodes broadly electrically connected to other circuit elements to further mean that first and second electrodes must be electrically connected to each other in order to apply different voltages to the liquid crystal.

### ***Status***

Claim 10 has been cancelled by Amendment. New claim 18 has been added. Claims 1-9 and 11-18 remain pending.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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Claims 1, 4, 6, 7, 9, 12 rejected under 35 U.S.C. 102(b) as being anticipated by Michibayashi et al. (US 5,680,190).

Per claims 1 and 9 (amended): Transistors disposed at the intersections of gate lines and source lines (Figure 1B, gate electrode 13 and source electrode 15a and TFT 25), pixel electrodes connected with the (drain electrodes of) transistors (Figure 1A, pixel electrode 23, Col. 5, Lines 35-37), opposite electrodes opposite to these pixel electrodes (counter electrode 24, Col. 4, Lines 62-64), and liquid crystal held between said opposite electrode and said pixel electrodes (liquid crystal 21, Col. 4., Lines 60-63), wherein said pixel electrodes comprise a first pixel electrode and a second pixel electrode disposed in a layer above an insulating film which is itself disposed in a layer above the first pixel electrode, and having a region that does not overlap with the first pixel electrode (Figure 1A: first sub-pixel electrode 23a and second sub-pixel electrode 23b, insulating film 14), and wherein the first pixel electrode and second pixel electrode are electrically connected (with said drain electrode) (Col. 2, Lines 65-67 and Col. 3, Lines 1 and 2, Col. 5, Lines 35-37)(Figure 9, sub-pixel 42an, contact hole 48, and sub-pixel 42bm), the first pixel electrode applying a first electric field to the liquid crystal, and the second pixel electrode applying a second electric field whose strength is different from the first electric field to the liquid crystal (Col. 6, Lines 26-40).

Per claim 4: An insulating film (14) is disposed in the layer below said gate line (13), and said first pixel electrode is disposed in the layer below said insulating film (Figure 1A).

Per claims 6 and 7: The first pixel electrode is disposed in the same layer as the drain lines of said transistors (Figure 1A) and said first pixel electrode is directly connected to the drain electrode of said transistors (Figure 1A).

Per claim 12: The pixel electrode is a transparent electrode (Col. 5, Lines 38-53).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 3, and 18 rejected under 35 U.S.C. 103(a) as being unpatentable over Michibayashi et al. (US 5,680,190) in view of Kim et al. (US 6,198,516 B1).

Per claims 2 (amended) and 18 (new): Michibayashi does not appear to explicitly specify a cumulative capacitance for stabilizing pixel potential during the holding period formed between the second pixel electrode and a storage capacitance electrode or between the second pixel electrode and the preceding gate line adjacent thereto; however, Kim has storage capacitance obtained between the storage line and the first pixel electrode and between the gate line and the second pixel electrode (Col. 3, Lines 34-38). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Michibayashi in view of Kim to reduce parasitic capacitance thereby reducing signal delay and thus fast operation of the LCD device is possible (Col. 3, Lines 39-47).

Per claim 3: Michibayashi does not appear to explicitly specify that the first pixel electrode is in the same layer as the gate line; however, Kim has a first pixel electrode in the same layer as a gate line (Figure 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Michibayashi in view of Kim for connecting the

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pixel electrode with the gate electrode, manufacturing ease and efficiency, and reduced process steps.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Michibayashi et al. (US 5,680,190) in view of Hirashi (US 6,335,771 B1) in further view of Hirabayashi et al. (US 6,320,204 B1).

Per claim 5: Michibayashi does not appear to have a first gate insulating film above a gate line and first pixel electrode in a layer above a first gate insulating film; however, Hirashi has these elements (Figure 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kim in view of Hirashi for manufacturing ease and simplicity.

Michibayashi does not appear to have a second gate insulating film in a layer above the first pixel electrode, and interlayer insulating film in the layer above the second gate insulating film and second pixel electrode in a layer above the interlayer insulating film; however, Hirabayashi has these general elements (Col. 14, Lines 30-41). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Michibayashi in view of Hirabayashi to stabilize and improve electrical characteristics of the various elements (Col. 2, Lines 1-5).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Michibayashi et al. (US 5,680,190) in further view of Sakamoto et al. (US 2001/0019392 A1).

Per claim 8: Michibayashi does not appear to have a second pixel electrode with an opening through which an insulating film and liquid crystal are held between the pixel electrode and opposite electrode in that opening; however, Sakamoto has a pixel with a slit through which

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liquid crystal domains are formed in the pixel and additional insulating films may be disposed under the pixel if so desired [0043] and [0037]. Sakamoto also has opposite electrodes [0043]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Michibayashi in view of Sakamoto for a multi-domain LCD with excellent viewing characteristics as noted in Sakamoto [0016].

Claim 11 rejected under 35 U.S.C. 103(a) as being unpatentable over Michibayashi et al. (US 5,680,190) in view of Zhang et al. (US 6,104,461).

Per claim 11: Michibayashi does not appear to have an insulating layer thickness of 500 nm or greater; however, Zhang has an insulating film that can range in thickness from 500 nm to 3.0 micrometers (Col. 10, Lines 1-5 and Col. 9, Lines 38-39). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Michibayashi in view of Zhang to prevent cracking and for desired optical properties.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Michibayashi et al. (US 5,680,190) in view of Lim et al. (US 2002/0109652 A1).

Per claim 13 (amended): Michibayashi does not appear to have a ratio of voltage applied to the liquid crystal between an opposite electrode and the first pixel electrode, and a voltage applied to the liquid crystal between an opposite electrode and the second pixel electrode of 0.5:1.0 to 0.9:1.0; however, Lim has voltages charged in first and second pixel electrodes that become equal to each other [0043]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Michibayashi in view of Lim for equivalent / similar coupling between first and second pixel electrodes as noted in Lim [0042 and 0043].

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Raynes et al. (US 5,541,753) in view of Michibayashi et al. (US 5,680,190).

Per claim 14 (amended): Raynes has an alignment layer disposed on the surface of each substrate in contact with the liquid crystal, for orienting said liquid crystal (Figure 1, alignment films 10 and 11), a polarizing plate disposed on the surface opposite to the surface of each of said substrates in contact with the liquid crystal (Figure 1, polarizing plates 1 and 4), and an optical compensating film disposed between said polarizing plate and said substrate (Figure 6, phase plates 30 and 31) having stabilized the orientation of the discotic liquid crystal (nematic, Col. 1, Lines 10-17).

While Raynes has first and second operating voltages for applying voltages to a liquid crystal, Raynes does not appear to explicitly specify first and second pixel electrodes electrically connected to each other and separated by an insulating layer such that spatially different voltages can be applied to the liquid crystal.

However, Michibayashi has such means for applying spatially different voltages to the liquid crystal in one of the plurality of pixels (Col. 6, Lines 26-40).

Michibayashi has this arrangement for enlarged viewing angle (Col. 6, Lines 26-40).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Michibayashi in view of Raynes for enlarged viewing angle.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Raynes et al. (US 5,541,753) in view of Michibayashi (US 5,680,190) and further in view of Kagawa et al. (US 6,423,385 B1).



Per claim 15: Raynes does not appear to explicitly specify a product of birefringence and thickness of  $0.30 \mu\text{m} \leq \Delta n * d \leq 0.50 \mu\text{m}$ ; however, Kagawa has a product of birefringence and thickness in the range of:  $0.2 \mu\text{m} < d * \Delta n < 0.4 \mu\text{m}$  (Col. 4, Lines 36-38). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Raynes in view of Kagawa for maximum intensity of transmitted light and for practicability (Col. 9, Lines 44-62).

Claims 16 and 17 rejected under 35 U.S.C. 103(a) as being unpatentable over Michibayashi et al. (US 5,680,190).

Per claims 16 and 17 (amended): Michibayashi does not appear to specify a step for manufacturing a first pixel electrode (connected with the drain electrode) applying a first electric field to the liquid crystal, a step for manufacturing an insulating layer in a layer above the first pixel electrode, and a step for manufacturing a second pixel electrode in a layer further above the insulating layer, said second pixel electrode having a region that does not overlap the first pixel electrode, and being electrically connected with the first pixel electrode and applying a second electric field whose strength is different from the first electric field to the liquid crystal.

However, as noted, Michibayashi has the structure defined by this method (For example, Figures 1A and 1B and 9).

Michibayashi has this structure for enlarged viewing angle as noted.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to derive the method steps from Michibayashi's device for an enlarged viewing angle.

### ***Conclusion***

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Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeanne A. Di Grazio whose telephone number is (703)305-7009. The examiner can normally be reached on M-F.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached on (703) 305-3492. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Jeanne Andrea Di Grazio

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